



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Serial No. 10/626,555

Confirmation No. 9329

In re Application of:

On Appeal From:

Nicolas ECHES, et al.

Group Art Unit: 3641

Filed: July 25, 2003

Examiner: Troy Chambers

For: SUB-CALIBERED PROJECTILES WITH MULTIPLE SUPPORTS

Board of Patent Appeals and Interferences  
U.S. PATENT AND TRADEMARK OFFICE  
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Randolph Building  
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AMENDED BRIEF ON APPEAL

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Appellants' Notice of Appeal filed December 13, 2006 appeals the final rejection of claims 1 to 8 as stated in the Office Action mailed June 15, 2005. Appellants request that those rejections of these claims be reversed for the reasons stated herein.

I. REAL PARTY IN INTEREST

The real party in interest is GIAT Industries, owner of the application by an Assignment recorded July 25, 2003 at Reel 014333, Frame 0383.

II. RELATED APPEALS AND INTERFERENCES

There is no appeal, interference, or other judicial proceeding known to appellants, the undersigned, or the assignee, that may be related to, directly affect, or be directly affected by, or have a bearing on the Board's decision in this case.

III. STATUS OF CLAIMS

The application was filed with 10 claims. A Preliminary Amendment filed July 25, 2003 eliminated the multiple dependency of claims 3 and 7. An Amendment filed February 3, 2005 revised claims 1 to 8. Claims 9 and 10 are withdrawn pursuant to a restriction requirement. Claims 1, 2, 4 and 6 were further revised in an Amendment Under 37 CFR 1.116 filed October 19, 2005, which was entered upon filing of a Request for Continued Examination (RCE) on November 20, 2005. Claims 1-5 and 7 were further amended in an Amendment filed April 4, 2006.

The claims on appeal are claims 1 to 8. See Claims Appendix hereto.

#### IV. STATUS OF AMENDMENTS

A Request for Reconsideration was filed October 16, 2006. No amendment awaits entry after the final Office Action.

#### V. SUMMARY OF CLAIMED SUBJECT MATTER

Appellants' claimed invention is a sub-caliber projectile (specification, page. 2, lines 22-26; p. 5, ll. 13-28) that includes a sub-caliber diameter penetrator [4] (p. 4, l. 7) and a sabot [2] (p. 4, ll. 8-12) of reduced mass, but which ensures improved guidance for the penetrator while in a gun barrel, avoiding oblique or non-coaxial positioning within the gun barrel and vibration of the penetrator within the gun barrel. The sub-caliber penetrator [4] has a caliber or diameter substantially less than the caliber or inside diameter of a gun barrel [7] (p. 5, l. 20) for firing such a penetrator, and is elongate with a lengthwise central axis. The penetrator is accompanied by a sabot [2] having a caliber substantially equal to the caliber of the gun barrel [7] in which the projectile is to be fired, and the sabot comprises at least two segments which surround the sub-caliber penetrator. See Fig. 3a copied on page 4, *infra*.

Each of those sabot segments comprises (a) a rear support seat [11] (p. 3, ll. 5-14) comprising radial studs [14] (p. 5, ll. 23-24) of substantially full gun barrel caliber located at a rear end of the segment; (b) a median support seat including a push plate [PP] (p. 2, ll. 30-33; p. 5, ll. 21-22) of substantially full gun barrel caliber located near the center of gravity of the sub-caliber projectile; and (c) a forward support seat [6] (p. 3, ll. 1-2) having radial arms of substantially full gun barrel caliber located at a front end of the segment and in front of the

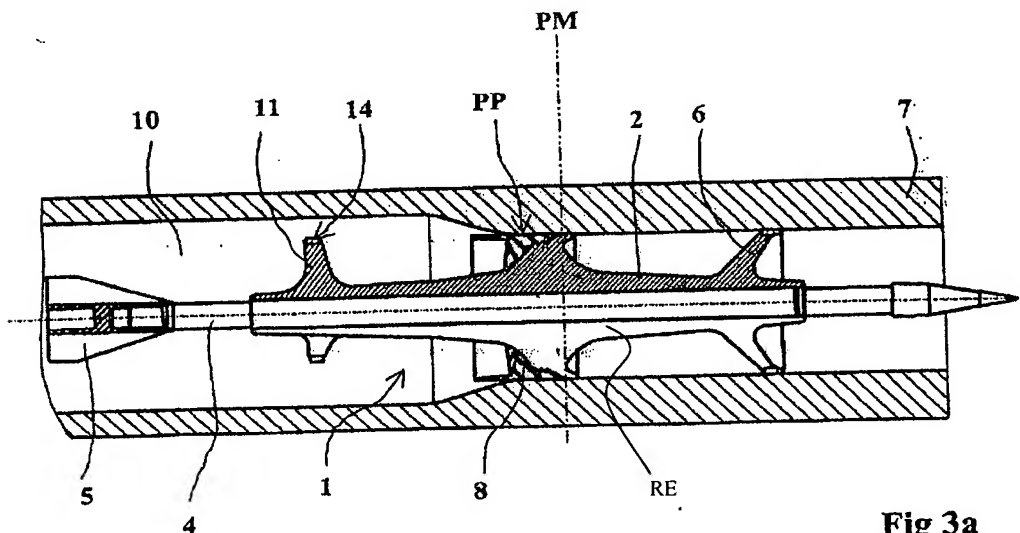
median support seat. The "push plate" [PP] of substantially full gun barrel caliber substantially fills the cross section of a gun barrel [7] for firing the claimed sub-caliber projectile.

Additionally, each sabot segment has a sub-caliber radial extent [RE (notation added here)] of some axial length between the median support seat [PP] and the forward support seat [6] elements of that segment. Each of the foregoing elements is recited in appellants' independent claim 1.

Claim 4 is dependent upon claim 1 and claim 3, and effectively recites that the push plate is positioned at an axial distance between 0.5 and 1.5 times the full gun barrel caliber from the center of gravity of the projectile.

And, dependent claim 6 specifies that each radial arm of the forward support comprises a foot comprising a plastic material for ensuring guidance of the sabot in a gun barrel.

An exemplary illustration of appellants' claimed invention, including the elements discussed above, is shown in appellants' Fig. 3a, which is photocopied below:



**Fig 3a**

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 3, 7 and 8 were rejected under 35 U.S.C. §103(a) over Sippel U.S. Patent 5,289,777 in view of Bisping U.S. Patent 4,524,695.
2. Claims 2, 4 and 5 were rejected under 35 U.S.C. § 103(a) over Sippel '777 in view of Bisping '695.
3. Claim 6 was rejected under 35 U.S.C. §103(a) over Sippel '777 and Bisping '695, further in view of Wilkerson U.S. Patent 5,313,889.

VI. ARGUMENT

A. Sippel '777 and/or Bisping '695 Do Not  
Render Obvious Appellants' Claimed Invention

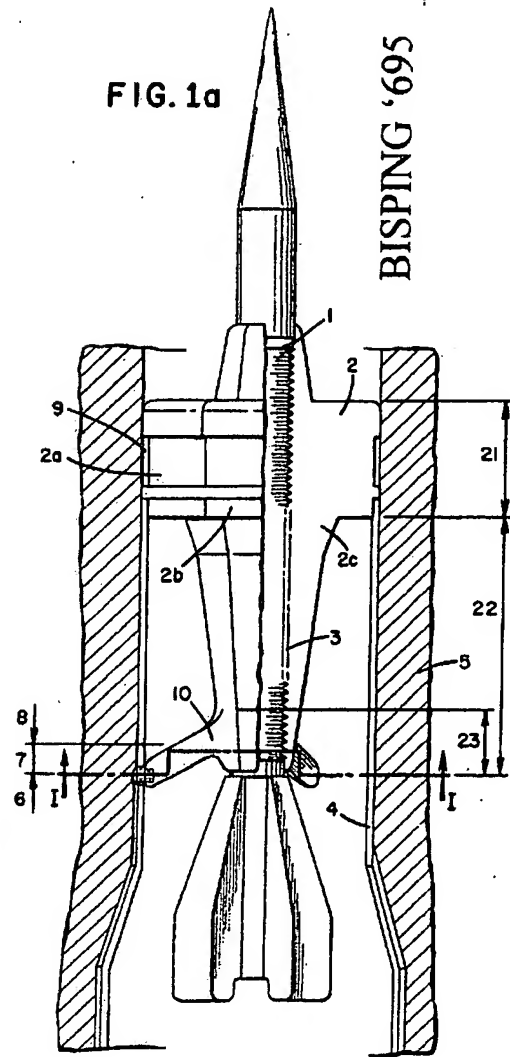
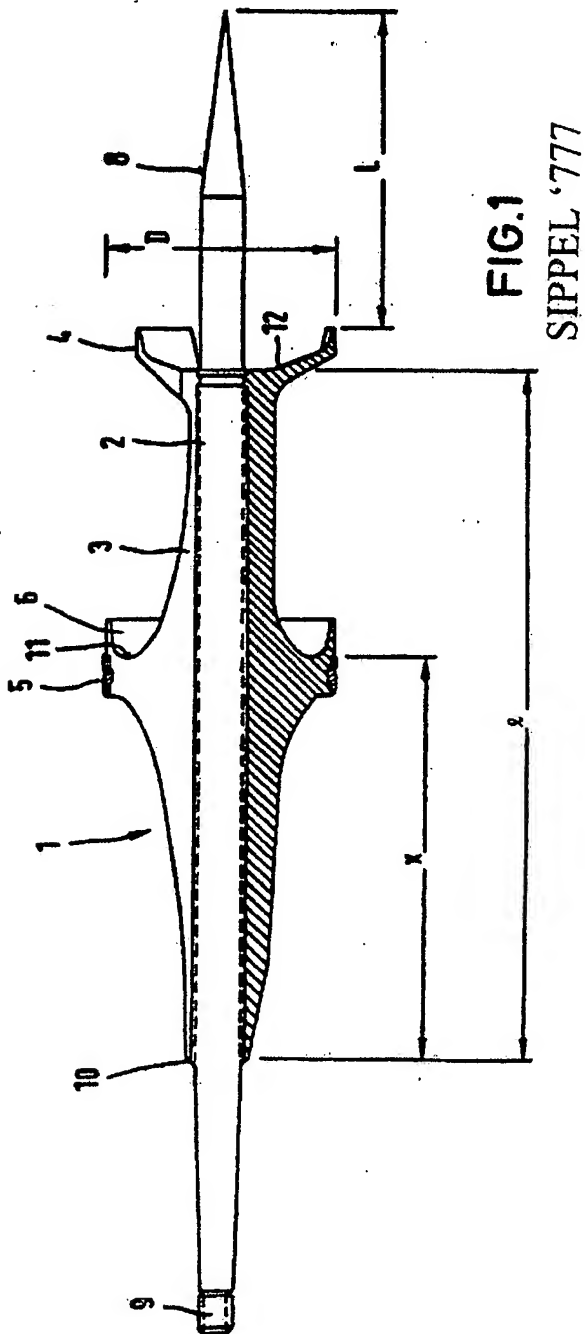
Claims 1-5, 7 and 8 were rejected under § 103(a) over Sippel '777 and Bisping '695. The final Office Action mailed June 15, 2006 admitted that Sippel, "does not disclose a substantially full gun barrel rear support comprising radial studs." Office Action, June 15, 2006, page 3. Indeed, Sippel does not disclose a sabot having a full caliber rear support seat.

However, that Office Action stated that Bisping '695 does disclose "such a feature" as shown in Bisping Fig. 2a (id. at 3-4). The Office Action then concludes that one of ordinary skill in the art "would have found it obvious to provide the sub-caliber projectile of Sippel with the rear support of Bisping." (id. at 4). And, the Office Action stated that "the suggestion/motivation for doing so would have been to allow for a practically constant

compressive pressure and ensure a proper guidance of the projectile during the barrel phase”

(id.).

Representative figures, Sippel Fig. 1 and Bisping Fig. 1a, are reproduced below:



However, neither Sippel nor Bisping expressed in their respective disclosures any need for constant compressive pressure that was not provided by the two-support seat sabot structures disclosed in each of those references. Neither of those references expresses any problem concerning “constant compressive pressure” not solved by the structure disclosed in each of those references. Further, neither Sippel nor Bisping expressed any need for any additional means to “assure a proper guidance of the projectile during the barrel phase,” beyond the structure disclosed in the two-support seat sabot structures disclosed in each of those references. Neither of those references disclosed any problem in “assuring proper guidance of the projectile during the barrel phase,” which proper guidance was not achieved by the two-support seat sabot structure disclosed in each of those references. Thus, no alleged “suggestion/motivation” for providing the Sippel projectile with the rear support of Bisping in fact arises from either Sippel or Bisping.

The Office Action, guided by the 20-20 hindsight of appellants’ disclosure and claims, simply picks and chooses among the elements of Sippel and Bisping and concludes, without suggestion or motivation from the prior art, that the exact combination recited in appellants’ claim 1 would have been obvious to one of ordinary skill in the art. But, in fact, the prior art actually demonstrates that one of ordinary skill in the art would have had no need with respect to constant compressive pressure or proper projectile guidance for randomly taking one part from one reference and adding it to the structure of the other reference. Only with the guidance of hindsight knowledge of appellants’ disclosure and claims would one of ordinary skill in the art

have combined certain elements of the prior art in the way first taught by appellants and only thereafter imagined in the Office Action.

As admitted in the Office Action, neither of the cited references discloses all elements of appellants' claimed invention. And, for the reasons demonstrated above, there is no disclosure or teaching in either Sippel '777 or Bisping '695 that would have suggested, absent appellants' disclosure, that one of ordinary skill in the art make a different structure by taking one part of one reference and adding it, without need, to the already completely functional structure disclosed in the other reference. There is no such suggestion in the disclosure of either Sippel '77 or Bisping '695. Thus, there is no disclosure or teaching in either of the cited references that would have suggested appellants' claim 1, 3, 7 and 8 invention to one of ordinary skill in the art.

With respect to the subject matter of appellants' claims 2, 4 and 5, the Office Action alleged that "it would have been obvious . . . to provide said dimensions, since it has been held that discovering an optimum value of a result-specific variable involves only routine skill in the art." Citing In re Boesch, 617 F.2d 272, [205] USPQ 215 (CCPA 1980). The Office Action further stated that the dimensions were not disclosed "as being critical" to the invention. No authority indicating that such fact is material to a non-obviousness analysis is cited in the Office Action, and no logic supporting that conclusion is presented either. And, the Office Action paraphrase omits a material portion of the In re Boesch statement. A more complete quotation of the relevant portion from that 1980 decision is:



[L]owering the  $N_v$  value of a Co-Cr-Ni alloy and deletion of the metals not consumed in the precipitation from the  $N_v$  calculation are expressly suggested. Considering, also, that the composition requirements of the claims and the cited references overlap, we agree with the Solicitor that the prior art would have suggested “the kind of experimentation necessary to achieve the claimed composition, including the proportional balancing described by appellants’  $N_v$  equation.” This accords with the rule that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. (citations omitted)

In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980), emphasis added here. The rule referred to in Boesch, but misstated in the Office Action, requires that the value in question be a variable in a known process. Here, the three-support seat sabot structure was unknown, so that the specific dimensions recited in each of appellants’ claims 2, 4 and 5 could not have been the discovery of optimum values of a result effective variable in a known structure. Appellants’ claimed structure was unknown, and the dimensions that appellants discovered to be suitable for use in that previously unknown invention were unknown to a further degree than appellants’ basic inventive structure itself. Thus, the dimensions recited in appellants’ dependent claims 2, 4 and 5 are at least as non-obvious as the basic structure recited in appellants’ independent claim 1.

The Office Action overreaches, thereby further exposing its own weaknesses. There is no sound basis cited or stated in the Office Action for rejection of appellants’ claims under §103(a). Accordingly, reversal of those rejections, and allowance of all claims 1-5, 7 and 8 are respectfully requested.

B. Wilkerson '889 Does Not Provide Suggestion to Cause the Sippel and Bisping Disclosures to Obviate Appellants' Claim 6 (or Claims 1, 4 or 5).

Dependent claim 6 was rejected over Sippel '777 and Bisping '695, further in view of Wilkerson '889. Wilkerson '889 discloses a two-seat support sabot structure generally like that of Sippel '777. Wilkerson '889, col. 4, line 22 discloses that protrusions 46 on forward support seats may be polypropylene. But Wilkerson discloses nothing that would have suggested to one of ordinary skill in this art any need to reconstruct the sabot structures of Sippel with a third support seat from Bisping. All of the arguments presented above herein with respect to claims 1-5, 7 and 8 still apply with respect to claim 6.

For all the foregoing reasons, there is no disclosure or teaching in any of Sippel '777, Bisping '695 or Wilkerson '889 that suggests appellants' presently claimed invention. Further, there is no disclosure or teaching in any of those references that would have suggested the desirability of combining any portions thereof effectively to anticipate or suggest appellants' claimed invention to one of ordinary skill in the art. This is true of the fundamental structure of appellants' invention recited in appellants' independent claim 1, which before appellants' invention thereof was unknown, and is even more applicable to appellants' dependent claims, such as dependent claims 2, 4 and 5, which recite dimensions which were a further degree more unknown. Thus, for all the reasons stated above herein, reversal of the rejections stated in the final Office Action, and allowance of all claims 1-8 are respectfully requested.

VII. CONCLUSION

For all the foregoing reasons, appellants' claims 1 to 8 patentably distinguish over the cited prior art. Judgment of this Honorable Board reversing the rejections, and allowing all claims 1-8, is respectfully requested.

Respectfully submitted,



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August 22, 2007

Enclosures: Appendices (3)

Attorney Docket No. 28971.0104

CLAIMS APPENDIX

1. A sub-caliber projectile comprising:
  - a sub-caliber penetrator having a caliber less than a caliber of a gun barrel for firing the penetrator, said penetrator having a lengthwise central axis;
  - a sabot dimensioned to have a caliber substantially equal a gun barrel caliber and comprising at least two segments and surrounding said sub-caliber penetrator, wherein each segment comprises:
    - a rear support seat comprising radial studs of substantially full gun barrel caliber located at a rear end of said segment;
    - a median support seat including a push plate of substantially full gun barrel caliber located near the center of gravity of said sub-caliber projectile; and
    - a forward support seat having radial arms of substantially full gun barrel caliber located at a front end of said segment in front of said median support seat, wherein said segment has a sub-caliber radial extent of some axial length between said median support seat and said forward support seat.
2. The projectile according to Claim 1, wherein the axial distance between said rear support seat and said forward support seat is not less than three times the gun barrel caliber.
3. The projectile according to Claim 1, further comprising a band, said push plate having at least one groove therein for receiving said band.

4. The projectile according to Claim 3, wherein said push plate is positioned at an axial distance from a median transverse plane (PM), said plane being orthogonal to said penetrator and passing through the center of gravity of said projectile, said distance being between 0.5 and 1.5 times full gun barrel caliber.

5. The projectile according to Claim 4, wherein said radial arms are angularly spaced around the axis of said sabot.

6. The projectile according to Claim 5, wherein each said arm comprises a foot comprising a plastic material for ensuring guidance of said sabot in a gun barrel.

7. The projectile according to Claim 1, wherein said radial studs, are evenly angularly spaced around said sabot.

8. The projectile according to Claim 7, wherein each said radial stud is integral with a segment of said sabot.

RELATED PROCEEDINGS APPENDIX

None.

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EVIDENCE APPENDIX

None.